FAA-E-2615
February 6, 1975

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
SPECIFICATION

DOPPLER VOR FREQUENCY MONITOR

1. SCOPE

1.1 Scope.- The equipment specified herein is a solid state monitor which operates over the frequency range of 108 to 118 MHz. This monitor is intended for use in a Doppler VHF omnirange (VOR) facility. The monitor samples the signals of a carrier transmitter and of a sideband transmitter (transmitters not required to be furnished under this specification). Input signals consist of a carrier signal and (separate) upper and lower sideband signals which are nominally 9960 Hz removed from the carrier frequency. The monitor provides alarm outputs whenever the frequency of the sideband signals deviates from nominal beyond pre-established limits. Visual displays are provided of the sideband difference frequency and of alarm status.

2. APPLICABLE SPECIFICATIONS

2.1 Specification issue.- The following specifications of the issue specified in invitation for bids or request for proposals form a part of this specification, and are applicable in their entirety except as specifically modified herein after.

2.1.1 FAA specifications.-

FAA-G-2100/1	Electronic Equipment, General Specification
FAA-G-2100/3	Requirements for Equipments Employing Semiconductor Devices

FAA-G-2100/4	Requirements for Equipments Employing Printing Wiring Techniques
FAA-G-2100/5	Requirements for Equipments Employing Micro-electronic Devices
FAA-G-2300	Panel and Vertical Chassis, Rack
FAA-D-2494/1	Instruction Book Manuscript Technical: Equipment and Systems, Requirements Part 1, Preparation of Manuscript
FAA-D-2494/2	Instruction Book Manuscript Technical: Equipment and Systems Requirements Part 2, Preparation of Manuscript Copy and Reproducible Artwork

(Copies of this specification, and of the other applicable FAA specifications, may be obtained from: Federal Aviation Administration Washington, D.C. 20591, ATTN: Contracting Officer. Requests should fully identify material desired, i.e., specification numbers, dates, amendment numbers, complete drawing numbers; also requests should identify the Invitation for Bid, Request for Proposal or Contract involved or other use to be made of the requested material.)

2.1.2 MIL Standards and specifications.-

MIL-E-17555	Electronic and Electrical Equipment, Accessories and Repair Parts; Packaging and Packing of
MIL-J-641	Jack, Telephone, General Specification for
MIL-STD-471	Maintainability Demonstration
MIL-STD-781	Reliability Tests, Exponential Distribution

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each monitor furnished by the contractor shall be complete in accordance with all specification requirements. Any feature or item necessary for proper operation in accordance with the requirements of this specification shall be incorporated even though that feature or item may not be specifically described herein. Instruction book material shall be furnished in accordance with FAA-D-2494/1 and FAA-D-2494/2 in quantities specified in the contract schedule.

3.2 Definitions.-

3.2.1 VOR carrier transmitter frequency.- For purposes of this specification the carrier frequency shall be assumed to have any value

in the range of 108.00 through 118.00 Megahertz at a stability of ±0.002%.

3.2.2 Doppler VOR upper sideband (USB) frequency.- A frequency which is nominally 9960 Hz higher than the carrier transmitter frequency.

3.2.3 Doppler VOR lower sideband (LSB) frequency.- A frequency which is nominally 9960 Hz lower than the carrier transmitter frequency.

3.2.4 Single sideband (SSB) Doppler VOR.- A system in which only the carrier and upper sideband frequencies are radiated.

3.2.5 Double sideband (DSB) Doppler VOR.- Same as 3.2.4 except that the carrier and both upper and lower sideband frequencies are radiated. In the DSB system the sideband frequencies are phase locked at 9960 Hz above and below the carrier frequency through use of a common 9960 Hz reference generator.

3.3 General functional requirements.- The equipment is intended for use in a Doppler VOR facility to continuously monitor the difference between the frequency of a carrier transmitter signal (3.2.1) and the upper sideband (USB) signal (3.2.2) of a sideband transmitter (see also 3.3.1). Interface requirements exist for RF signal inputs, remote control of input signal selection, and alarm output signaling. The equipment shall provide remote and local alarm indications whenever the measured frequency exceeds pre-established alarm limits. Local controls shall be provided for maintenance and test purposes and shall include provision for the measurement and display of the frequency differences between carrier and USB signal and carrier and LSB signal (when present, see 3.3.1). Major performance requirements are accuracy of frequency measurement, stability of monitor alarm limits, monitor response, and fail-safe operation.

3.3.1 Single sideband/Double sideband operation.- The equipment shall be capable of single sideband operation (3.2.4) or double sideband operation (3.2.5) without requirement for equipment readjustment. In either mode of operation, the monitor portion is required to operate with carrier and upper sideband signal inputs only, however, the equipment shall provide for processing of a lower sideband signal input (present in DSB Doppler only) for measurement and display purposes. Operation of the monitor portion shall not be affected by the presence or absence of a LSB signal at the input terminals of the equipment. (Note: System malfunctions involving loss of phase coherency between USB and LSB sidebands or reversal of these two signals will be detected by other ground station monitors not required to be furnished under this specification).

3.4 Service conditions.- The service conditions shall be those of paragraph 1-3.2.23, FAA-G-2100/1 with the ambient conditions of ENVIRONMENT II thereof. Duty shall be continuous except for circuits utilized exclusively for the frequency measurement (3.14). All performance requirements shall be met within 40 seconds after initial

application of primary power to the equipment.

3.5 Power sources.- The equipment shall operate from a single phase, 120 V, 60 Hz, two-wire AC line for primary power; and from a single phase, 240V, 60 Hz two-wire AC signal source for remote control purposes (Voltage are design center values; see 1-3.2.21 of FAA-G-2100/1.)

3.6 Frequency.- The equipment shall operate over the frequency range of 108 to 118 MHz. All specification requirements shall be met over this range without component replacement or circuit retuning.

3.7 Electronic devices.- All active electronic devices shall be semiconductor devices in accordance with FAA-G-2100/3 or micro-electronic devices in accordance with FAA-G-2100/5. Tubes shall not be employed.

3.8 Modular construction.- Modular construction with plug-in or easily replaceable subassemblies shall be employed throughout the equipment. Modularization shall be based on logical functional block concept. As a minimum, separate modules shall be provided for power supply, audio and video circuits, and RF circuits. Design shall be such as to minimize the average cost and number of different types of modules required for supply support.

3.8.1 Printed wiring boards.- Except for critical RF applications (see 3.8.2) and except for controls and components specified to be located elsewhere, or where impractical from the standpoint of parts size or weight, all circuit parts shall be mounted on printed wiring boards in accordance with FAA-G-2100/4. All boards shall be of the plug-in type with suitable metal or thermosetting plastic guides and shall be keyed such that they can be inserted only in the correct receptacle and in the correct orientation for proper circuit connection. Where necessary to provide unrestricted access to all components for trouble-shooting purposes, board extender(s) shall be furnished. A minimum of one extender of each type required shall be furnished in a suitable storage space within the equipment.

3.8.2 RF modules.- RF modules shall be printed wiring boards as described in 3.8.1 except where such practice is not consistent with circuit performance requirements. RF modules shall be plug-in except that standard coaxial connectors (Type N or TNC) may be used for RF interconnection. Tuning controls shall be readily accessible when the modules are in place. Where necessary to provide unrestricted access to all components for trouble shooting purposes, extender cable(s) shall be furnished. A minimum of one extender cable of each type required shall be furnished in a suitable storage space within the equipment.

3.9 Equipment construction.- The equipment shall be constructed on a Type I rack panel with front access door in accordance with Specification FAA-G-2300. The panel height shall not exceed size "G" (Drawing D-21140 D of FAA-G-2300). The requirement for maximum depth of chassis (Dimension "W" of Drawing D-21342 H of FAA-G-2300) is hereby waived; however, the overall depth, including components mounted on the rear of

the chassis, shall not exceed 14 3/4 inches. Input RF connectors shall be type N mounted on the rear of the equipment chassis. Control signal connections shall be through a barrier type terminal block located on the rear of the equipment chassis. The terminal block shall be Cinch Manufacturing Company No. 142-Y, General Products Corporation GEN-PRO 442-Y, or equal. An AC line receptacle and attachment cord shall be provided in accordance with paragraph 3.9.1 of FAA-G-2300.

3.9.1 Equipment front panel component layout.- The following is a summary of components to be provided on the equipment front panel. At least fourteen calendar days prior to start of fabrication the contractor shall submit a detailed full-scale drawing of the proposed front panel layout to the FAA Contracting Officer or his designated Technical Representative for approval.

a) Main power switch, fuse, and indicator light (green) (FAA-G-2100/1).

b) Remote control voltage fuses and indicator (neon, amber) (3.11.1).

c) Input status indicator lights (2 each, blue) (3.10.1.1).

d) Monitor status indicator lights (1 each blue and red) (3.13.4).

e) Monitor remote alarm bypass indicator light (amber) (3.13.6).

f) Input selector switch (3.11.2).

g) Frequency counter input selector switch (3.14.2).

h) Frequency counter display (3.14.3).

i) Audio input test jack (3.13.8).

j) Equipment nameplate (1-3.14.5 of FAA-G-2100/1).

NOTE 1: The requirements of 1-3.16.5.2 of FAA-G-2100/1 for lens colors are modified to the extent specified above.

NOTE 2: The restrictions of subparagraphs (a) and (b) of 1-3.16.5.2.1 of FAA-G-2100/1 are waived for item (b) above.

NOTE 3: Except for item (b) above, all indicator lights shall be miniature incandescent types operating from a design center voltage not in excess of 26 volts.

3.10 RF signal inputs.- A total of six (6) Type "N" connectors shall be provided on the equipment rear chassis for connection of the carrier and sideband signals of each two sets of transmitters in a dual equipment Doppler VOR facility. The inputs shall be designed as follows:

a) USB #1

b) Carrier #1

c) LSB #1

d) USB #2

e) Carrier #2

f) LSB #2

3.10.1 Input switching networks.- An input switching network (see Figure 1) shall be provided to connect either the signals of transmitter set #1 (a, b, and c of 3.10) or the signals of transmitter set #2 (d, e, and f of 3.10) for processing in response to remote or local control signals as described under paragraphs 3.11.1 and 3.11.2.

3.10.1.1 Input status lights.- Two each front panel indicator lights with blue lenses shall be provided to indicate the status of the input switching network (No. 1 or No. 2 inputs connected).

3.10.2 Input impedance and VSWR.- Each input connector shall provide an input impedance of 50 ohms at a VSWR not in excess of 1.5. This requirement shall be met in either condition of the input switching network.

3.10.3 Input switching isolation.- A minimum of 26 dB of isolation shall be provided in each of the three signal channels (USB, Carrier, and LSB) between the respective signal sources. (e.g., with transmitter #1 inputs selected, the signal at the USB output jack due to presence of signal at the USB #2 input jack shall not exceed a level which is 26 dB below the level obtained when the same input is connected to the USB #1 input jack. Reference Figure 1, input switching circuit.)

3.10.4 Carrier input signal.- The carrier input signal is a signal at the carrier frequency defined in 3.2.1 which may be amplitude modulated (simultaneously, or any combination simultaneously) at the following frequencies and levels:

30 Hz reference signal	28-32 percent
1020 Hz identification signal	5-8 percent
300-3000 Hz voice signal (Peak)	30 percent

In addition and simultaneously with the above, the carrier input signal may be phase modulated to a maximum deviation of 0.5 radian at the rate of 6480 Hz.

All performance requirements of the equipment shall be met with a carrier input signal of any combination of the foregoing frequency and modulation characteristics and having any level within the range of 20 milliwatts to 2 watt total power.

3.10.5 Sideband input signals.- The sideband input signals are unmodulated CW signals, one at the upper sideband (USB) frequency and one at the lower sideband (LSB) frequency as defined in 3.2.2 and 3.2.3 respectively. All performance requirements of the equipment shall be met with sideband input signals having any level within the range of 50 to 250 milliwatts.

3.10.6 Input level variation.- Input level controls may be utilized, if necessary to provide operation over the range of signal levels specified in 3.10.4 and 3.10.5. After initial adjustment of controls for any input level within the specified range, the equipment performance shall not be affected by subsequent variations in input level between +1 dB and -3 dB of the initial value.

3.11 Operational control.

3.11.1 Remote control.- When the input selector switch (3.11.2) is in its center or "remote" position, the input switching network (3.10.1) shall operate in response to the presence of or absence of a 240 VAC external control signal. In the absence of the signal the #1 set of input signals shall be connected and in the presence of the signal the #2 set of input signals shall be connected. A terminal block (3.9), fuses and indicator light (3.9.1b) shall be provided. Load current shall not exceed 50 ma and the DC resistance to ground from either input terminal shall be not less than 1 megohm. An isolation switch (S2 on Figure 1) shall be provided for disabling the control voltage. This switch shall be located behind the equipment front panel door in a location such that it is readily accessible upon opening the door. The switch shall be mechanically interlocked so that it is automatically closed when the door is closed.

3.11.2 Local control.- Local control shall be provided by means of manual, 3-position, rotary INPUT SELECTOR switch located on the equipment front door. The switch positions shall be designated "No. 1," "REMOTE", and "No. 2". Placement of the switch into either "off center" position shall cause the input switching network (3.10.1) to connect the selected set of RF input signals (No. 1 or absence of the 240 VAC remote control signal voltage (3.11.1)). In addition, such placement shall bypass the monitor output alarm signal (3.13.5) and cause the monitor BYPASS indicator light to be energized.

3.12 Signal processing.- (See Figure 2). Separate circuits shall be utilized to process and combine:

a) the USB and carrier input RF signals, and

b) the LSB and carrier input RF signals

and to recover the difference (beat) frequency (nominally 9960 Hz) of each combination. The difference frequency shall be measured, for monitor and display purposes, by direct digital counting (events per unit time). Note: Figure 2 is a simplified block diagram and is not intended to

illustrate details of signal processing (e.g. demodulation, filtering, limiting..... etc) which may be required to provide specified performance requirements.

3.13 Frequency monitor.- The frequency monitor shall continuously measure the difference in frequency between the carrier and USB input signals and provide local and remote indications when the frequency deviates from its nominal value of 9960 Hz beyond pre-established limits. Means shall be provided for setting of alarm limits and of testing alarm operation by introduction of an external audio oscillator test signal.

3.13.1 Alarm limits.- The monitor shall provide alarm indication whenever the frequency of the input signal falls outside of the range of 9960$\pm$d Hz where "d" shall be selectable to any value between 5Hz and 100 Hz at intervals of 5Hz or less. Selection shall be accomplished by the placement of switches or the positioning of jumpers or straps. It shall be possible to program the monitor alarm limits in 10 minutes or less without the use of tools other than an ordinary screw driver and/or soldering iron.

3.13.1.1 Alarm limit tolerances.- The alarm limit tolerance shall be $\pm$0.01% (time base accuracy 3.13.2) $\pm$ 1Hz (ambiguity).

3.13.2 Time base accuracy.- The frequency monitor shall operate by counting the number of cycles of input signal occuring in a 1.0 second time interval. The time base source shall have an overall accuracy, including stability over the equipment service conditions, of $\pm$0.01% or better. The use of ovens is prohibited.

3.13.3 Monitor response and alarm delay.- Within 4 seconds after initial application of carrier and USB signals providing a difference frequency within the pre-established alarm limits, the monitor shall respond to provide local and remote indications of normal operation (no-alarm). Within 2 to 3 seconds after removal of either or both input signals, or of a change in the difference frequency beyond the pre-established alarm limits (and providing the frequency remains out of tolerance during this time) the monitor shall respond to provide local and remote indications of abnormal operation (alarm).

3.13.4 Monitor status lights (local indicators).- Two (2) indicator lights, one with blue lens designated "NORMAL" and the other with red lens designated "ALARM" shall be provided on the equipment front panel. One or the other light shall be energized at all times corresponding to the appropriate status condition described in 3.13.3.

3.13.5 Monitor alarm relay.- A monitor alarm relay shall be utilized to provide remote indication of monitor status. The relay shall have its output contacts (Form A) connected to a pair of output terminals on the rear of the equipment chassis. The relay shall be energized and its contacts closed whenever the monitor status is normal (corresponding to blue light indication of 3.13.4) and shall be de-energized and its contacts open whenever the monitor is in alarm status (corresponding to red light indication of 3.13.4). The alarm relay contacts shall be rated at 1 ampere,

230 volts (AC or DC) and isolated from equipment terminals and ground.

3.13.6 Remote alarm bypass relay.- A second relay with output contact configuration and rating identical to the monitor alarm relay (3.13.5) shall be provided with its output contacts connected in parallel with the same output terminals. The relay shall be energized whenever the Input Selector Switch (3.11.2) is placed in one of its local (off-center) positions and also whenever an audio oscillator test plug is inserted in the frequency monitor input test jack (3.13.8). The relay shall be de-energized at all other times. A second set of contacts shall be provided to energize an amber "ALARM BYPASS" indicator light on the equipment front panel whenever the alarm bypass relay is energized.

3.13.7 Monitor fail-safe operation.- The design of the frequency monitor shall be such as to provide fail-safe operation. Failure of parts or other malfunction shall either result directly in an alarm indication (monitor alarm relay de-energized) or, as a minimum, shall not cause the monitor to tolerate wider frequency variations or longer durations of out of tolerance signals than the values measured in the absence of malfunction.

3.13.8 Audio input test jack.- An audio input test jack shall be provided on the equipment front panel for use in testing the monitor alarm limits. The test jack shall be Type JJ-093 per MIL-J-641. When a mating telephone plug (tip and sleeve) carrying a test signal from an audio oscillator (see 3.15(d)) is inserted in the test jack, the normal input to the frequency monitor and frequency counter shall be removed and the test signal applied in its place (see Figure 2). Insertion of the plug shall also result in energization of the remote alarm bypass relay (3.13.6).

3.14 Frequency measurement and display.- The frequency measurement and display section shall measure and display the difference frequency between the carrier and USB input or between the carrier and LSB, depending on the position of a Selector Switch (3.14.2). Use of the measurement and display function shall not interfere with normal operation of the monitor portion of the equipment.

3.14.1 Accuracy and range.- The accuracy of measurement and display shall be $\pm 0.01\% \pm 1.0$ Hz (ambiguity) when the difference frequency is within the range of 0 to a minimum of 19,999 Hz. The display shall show an overload when the difference frequency exceeds the maximum display indication by means of an OVER LOAD light or by displaying dashes on the display.

3.14.2 Selector switch.- A three position switch shall be mounted on the front panel to allow display of the difference frequency between the carrier and USB, or between the carrier and LSB, or to blank the display.

3.14.3 Frequency display.- A five character solid-state light emitting diode (LED) display shall be provided on the front panel of the monitor to indicate the selected (3.14.2) difference frequency in Hertz. Each character shall be a 5 x 7 matrix at least 0.27 inches in height. Leading zeros shall be blanked out.

3.14.3.1 Display storage.- The monitor shall provide a continuous display of the most recent difference frequency measurement (3.14.1).

3.14.4 Warm up time.- All performance requirements of the monitor display section shall be met within 30 seconds of application of power to equipment circuits by operation of the selector switch (3.14.2) predicated upon prior application of main equipment power for a period of 40 seconds (3.4).

3.15 Corrective maintenance.- When the supplier of equipment to this specification is concurrently required to develop corrective maintenance procedures for the equipment, as for equipment maintenance manuals or in conjunction with a maintainability program (3.17), such procedures shall be capable of accomplishment using only the Government furnished VOR station test equipment listed hereunder in addition to the internal equipment features.

a) VTVM HP model 410 B, or equal

b) Volt-Ohmeter Triplett 630 NA, or equal

c) Oscilloscope, DC to 100 kHz; modified for direct application of 108-118 MHz to deflection plates, Dumont Model 2559 or equal.

d) Audio oscillator, HP Model 200 AB, or equal.

e) Digital frequency counter, 0 to 1.0 MHz.

3.16 Reliability program. - The contractor shall conduct a reliability program as described in 1-3.19 of FAA-G-2100/1. The specified mean time between failure (MTBF) of the equipment shall be 9600 hours including a minimum of 800 operational usages of the frequency measurement and display function comprising not less than 800 hours of total operating time. The program shall include demonstration testing (4.5).

3.17 Maintainability program.- The contractor shall conduct a maintainability program as described in 1-3.20 of FAA-G-2100/1. The program shall include a demonstration phase (4.6) and shall establish that the following requirements are met:

a) The mean time to repair (MTTR) shall not be more than 30 minutes, based on the availability of spare printed circuit boards. In addition, 90 percent of all repairs shall be accomplished in not more than 45 minutes. No single repair shall require more than 90 minutes.

b) The preventive maintenance time (MPMT) shall not exceed 15 minutes in 2400 hours of operation.

4. QUALITY ASSURANCE PROVISIONS.

4.1 General.- See section 1-4 of FAA-G-2100/1.

4.2 Design qualification tests.- The following design qualification tests shall be conducted. Tests marked with a single asterisk (*) should be conducted at three (3) carrier RF input frequencies, 108 MHz, 113 MHz, and 118 MHz to demonstrate the requirements of paragraph 3.6. Tests marked by double asterisks (**) shall be conducted at maximum and minimum RF input power levels to the equipment (pars. 3.10.4 and 3.10.5).

Test	Paragraph
SSB/DSB Operation (*)	3.3.1
Input Impedance and VSWR (*)	3.10.2
Input switching isolation (*) (**)	3.10.3
Phase modulated carrier (*) (**)	3.10.4
Input level variation (*) (**)	3.10.6
Alarm limit (settability)	3.13.1
Alarm limit tolerance (*) (**)	3.13.1.1
Monitor response and alarm delay (*) (**)	3.13.3
Monitor fail safe	3.13.7
Measurement range and accuracy (*) (**)	3.14.1

4.2.2 Service conditions.- None

4.3 Type tests.- The following tests shall be conducted at 113 MHz.

4.3.1 Normal test conditions.- The following tests shall be conducted.

Test	Paragraph
Input impedance and VSWR	3.10.2
Input switching isolation	3.10.3
Carrier input signal level range	3.10.4
Sideband input level range	3.10.5
Input level variation	3.10.6

4.3.2 Service conditions.- The following type tests shall be made while subjecting the equipment to the test procedure described under 1-4.12 of FAA-G-2100/1 except that Step 3 and Step 6 thereof are modified to reduce the permitted warm-up times from 15 minutes to 40 seconds (see 3.4.) The equipment shall be operated with one watt carrier power input at 113

MHz and at 175 milliwatt of USB and LSB signal. Tests marked by asterisk (*) shall be performed at 104, 120, and 138 VAC line voltage input.

Test	Paragraph
Presence or absence of LSB	3.3.1
Input switching network (*)	3.10.1
Input status lights	3.10.1.1
Input level variation (*)	3.10.6
Remote control (*)	3.11.1
Local control (*)	3.11.2
Alarm limit tolerance (*)	3.13.1
Time base accuracy	3.13.2
Monitor response and alarm delay (*)	3.13.3
Monitor status lights	3.13.4
Monitor alarm relay (*)	3.13.5
Remote alarm bypass relay (*)	3.13.6
Accuracy and range (*)	3.14.1
Selector switch	3.14.2
Display storage (*)	3.14.3.1
Warm-up time	3.14.4

4.4 Production tests.- The following production tests shall be made. Tests shall be conducted on 113 MHz. The RF signal level shall be the same as in 4.3.2.

Test	Paragraph
Input switching network	3.10.1
Input status lights	3.10.1.1
Input level variation	3.10.6
Remote control	3.11.1
Local control	3.11.2

Alarm limit tolerances	3.13.1.1
Monitor response and alarm delay	3.13.3
Monitor status lights	3.13.4
Monitor alarm relay	3.13.5
Remote alarm bypass relay	3.13.6
Audio input test jack	3.13.8
Accuracy	3.14.1
Selector switch	3.14.2
Display storage	3.14.3.1

4.5 Reliability demonstration test plan.- The reliability demonstration test plan shall be Test Plan XXV, of MIL-STD-781. The test shall be conducted under normal test conditions with input signal switching (3.11.1) and line voltage variation at an average frequency of not less than once each 72 hours.

4.6 Maintainability demonstration test plan.- The contractor shall design and implement a maintainability demonstration plan such that the probability of the Government accepting an equipment that does not meet MTTR and MPMT requirements does not exceed 0.1. The contractor shall design plans whereunder fault simulation for corrective maintenance tasks shall be performed by the introduction of faulty parts, deliberate misalignment and "bugging" as specified in MIL-STD-471. Preventive maintenance will not be charged against MTTR. Further, the contractor may assume that time-to-repair data will not include logistic delay, i.e., maintenance personnel, parts and tools are available at the site. The contractor shall demonstrate MTTR (corrective maintenance) by applying Method 4 (90 percent confidence) from MIL-STD-471 using the fault simulation time-to-repair data.

5. PREPARATION FOR DELIVERY

5.1 General.- Unless otherwise specified in the contract, the equipment shall be prepared for domestic shipment in accordance with the following subparagraphs.

5.2 Preservation and packaging.- Preservation and packaging shall be in accordance with Specification MIL-E-17555, Level A.

5.3 Packing.- Packing shall be in accordance with Specification MIL-E-17555, Level B. No more than one equipment and associated items shall be packed in each shipping container.

5.4 Marking.- Each package and shipping container shall be durably and legibly marked with the following information:

Name of Item and FA Designation

Serial Number

Quantity

Contract Number

Federal Stock Number

Gross Weight of Container

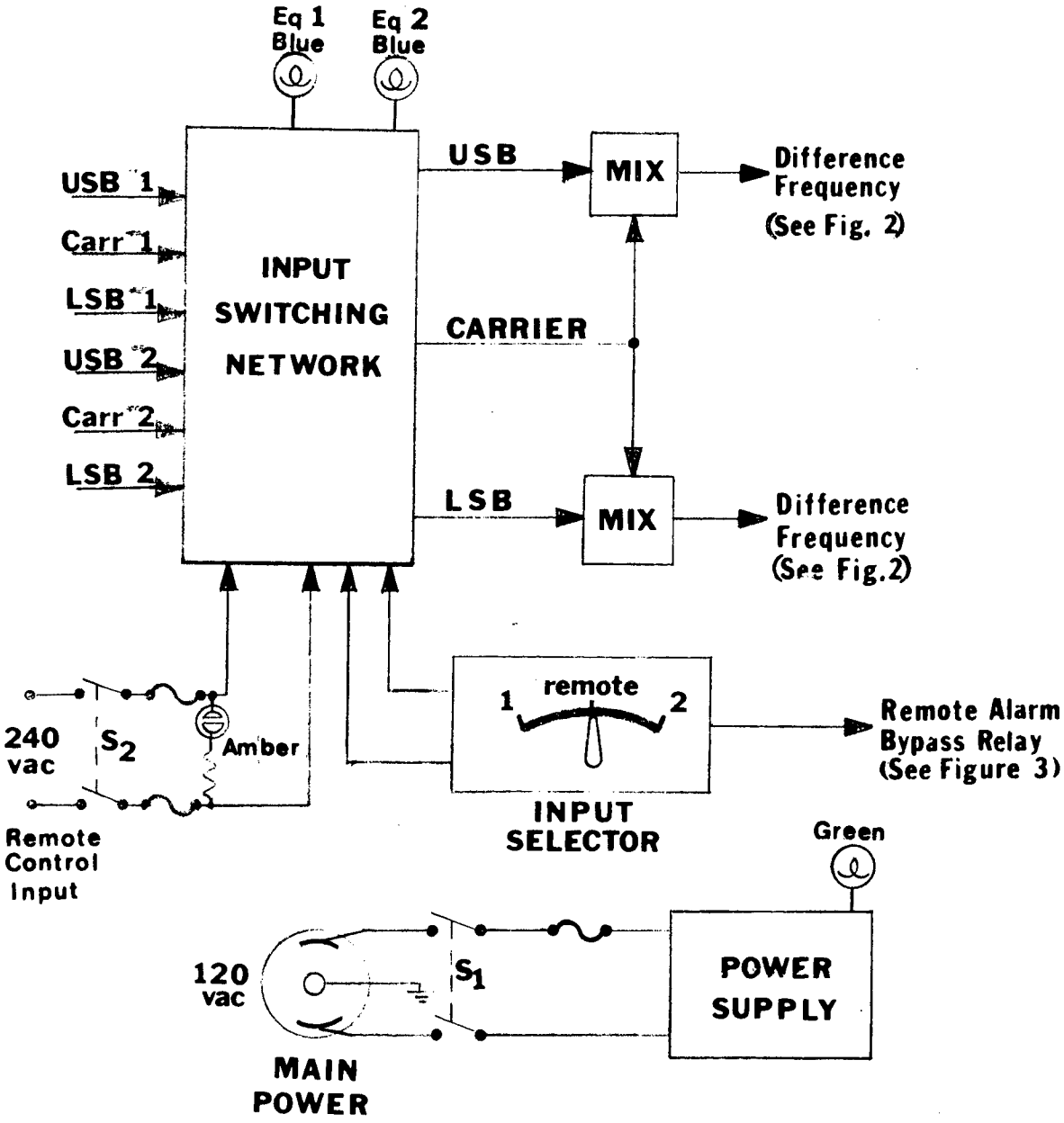
Manufacturer's Name

6. NOTES

6.1 None

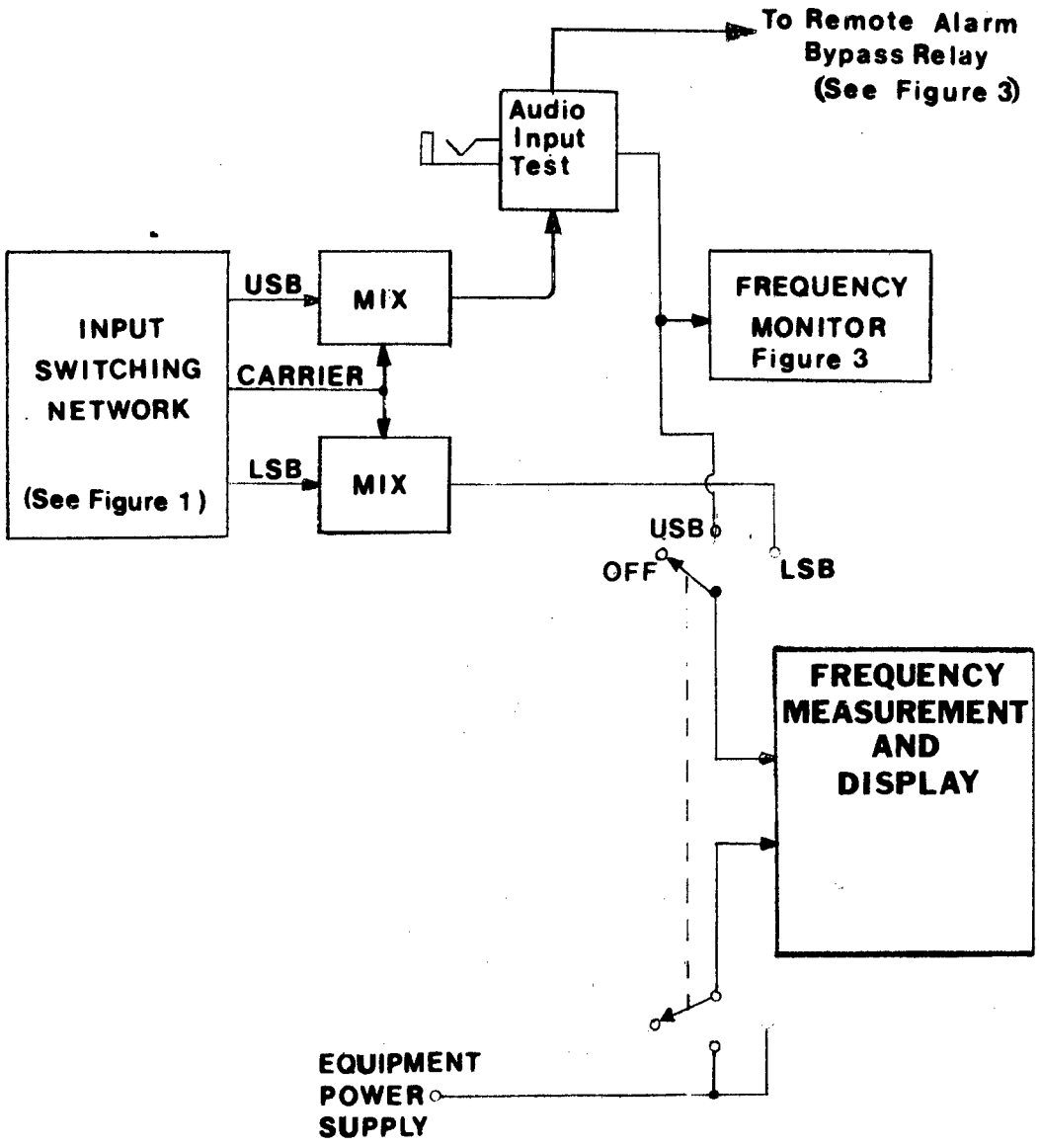
* * * * *

FOR FIGURES 1 TO 3, SEE PAGES 15 TO 17



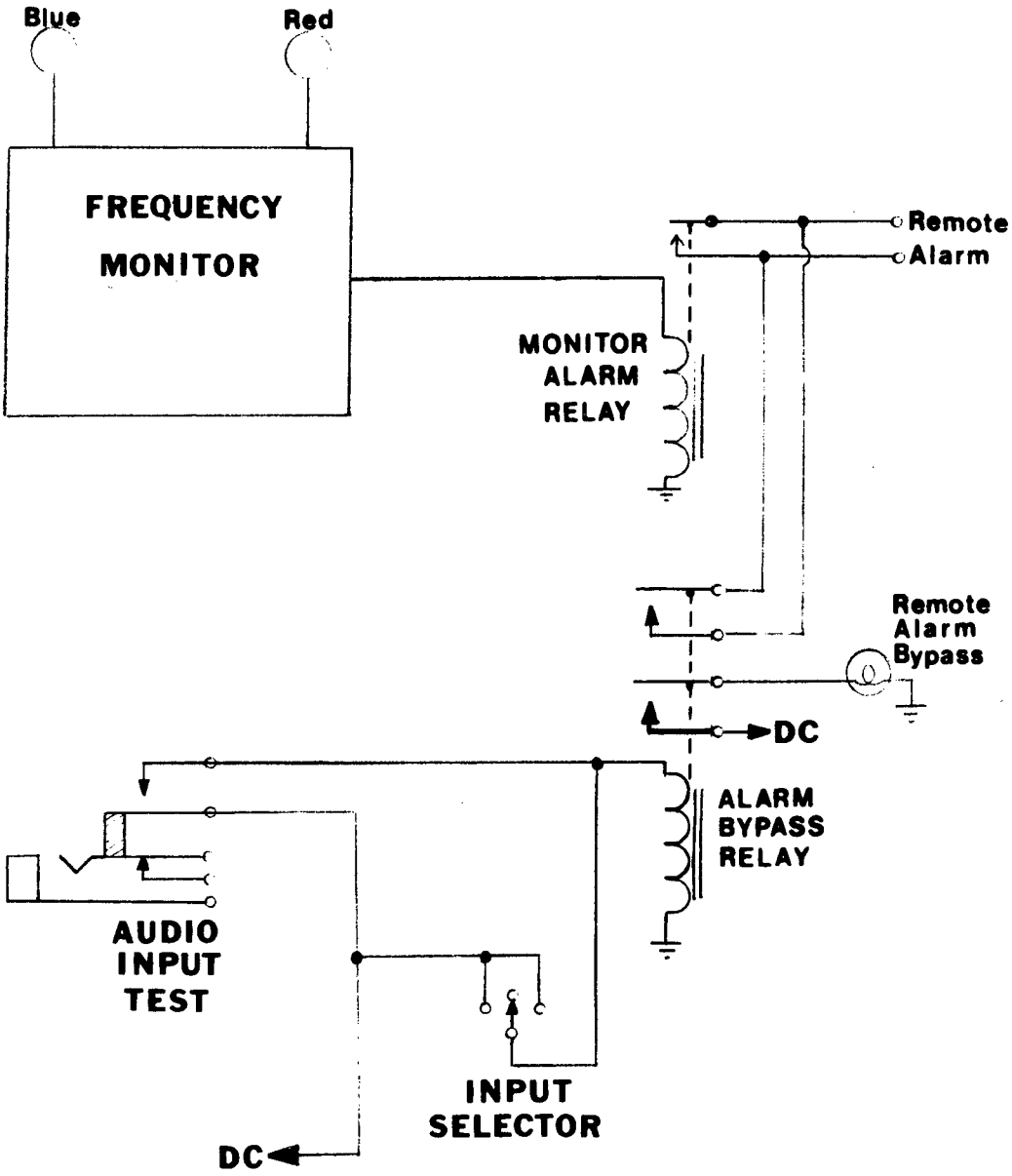
POWER AND CONTROL BLOCK DIAGRAM

FIGURE 1



FREQUENCY MEASUREMENT AND DISPLAY BLOCK DIAGRAM

FIGURE 2



LOCAL/REMOTE

MONITOR

FIGURE 3

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